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ACTIVITIES OF THE GARM GEOPHYSICAL EXPEDITION, ACADEMY OF SCIENCES USSR, IN 1949

B. F. Bonchkovskiy

Continuing its activity in 1949, the Garm Geophysical Expedition of the Geophysics Institute, Academy of Sciences USSR, is conducting detailed seismic observations and precision geodesic measurements and is studying tilts of the earth's surface, earth currents, atmospheric electricity, and variations in the geomagnetic field. The equipping of the granite column, which was excavated in 1948, was completed in December 1949. A general description of the works conducted in 1949 follows:

The existing seismic stations in seismic regions, which are located from 100 to several hundred kilometers apart, have a magnification of 1,000 and cannot record weak local earthquakes, which undoubtedly exist and constitute an important characteristic of the general seismic conditions in the earth's crust and in the regions beneath the crust. Since a concentration of weak earthquakes may be a prelude to destructive earthquakes, it was suggested that several temporary seismic stations having equipment with high sensitivity and high resolving power be organized and that these stations be located not more than 100 kilometers apart. The expedition carried out this program of studies and in a period of 2 months obtained extensive data from recordings of more than 2,000 earthquakes at each of these stations. Preliminary processing of this data indicated in the region of the destructive earthquake of 1949 a concentration of the centra of weak earthquakes, which proved to be the after-shocks of this earthquake.

Geotectonic studies reliably established the relation between seismic centra and the surface of discontinuity in the earth's crust (contact surface of rocks of different geological periods). A slight elastic or plastic deformation is naturally assumed to take place in the region directly bordering the surface of discontinuity before collapse of equilibrium (before faulting). Tilt measurements, having an accuracy up to 0.1 second of an arc, should answer these questions. For this purpose, the expedition organized tilt measurements at several points along a line perpendicular to the surface of discontinuity. The first results of these measurements revealed a difference in

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the character and direction of rock movements along both sides of the discontinuity. It should be noted that tilt measurements along one side of the discontinuity line, but at different points, produced similar indications. In addition, the expedition clarified some causes of disturbances in the behavior of tilts before earthquakes; however, the disturbances themselves are very small in magnitude, and thus are unnoticed where the tilts themselves are considerable.

As previously discovered by experiments, electric fields on the earth's surface appear simultaneously with the start of oscillatory motion from an explosion, and also atmospheric electric disturbances before destructive earthquakes have been observed occasionally; therefore, systematic studies of these phenomena must be set up in connection with earthquakes. The expedition organized observations on earth currents and atmospheric-electric phenomena. The works in this field gave some encouraging results and pointed out the necessity for further development of these studies. Slight variations in the geomagnetic field were also studied for this purpose.

One of the direct indexes of movement of the earth's crust before and after earthquakes is provided by the results of high-precision geodesic studies. In 1948, the expedition made triangulation and polygonometric surveys in the Garm region. After the destructive earthquake of 10 July 1949, the survey was repeated from the previous datum marks. Preliminary data established both horizontal and vertical displacements, and the magnitude of the displacements was several times greater than the accuracy of the geodesic measurements.

These works are highly promising and their repetition in the same region should provide concrete data on the character and magnitude of slow movements of the earth's surface.

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